Appendix G5
Air Quality – Nitrogen Dioxide, Sulfur Dioxide, Carbon Monoxide, and Particulate Matter Emissions

1. INTRODUCTION

A screening-level air quality analysis was conducted to evaluate potential air quality impacts associated with emissions of NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ generated during Project-related construction activities. Air quality impacts were evaluated for the following seven construction activity scenarios:

1. Trenching (part of onshore pipeline installation);
2. Pipelay (part of onshore pipeline installation);
3. Boring (part of onshore pipeline installation);
4. Drilling (part of onshore pipeline installation);
5. Shore Crossing Construction;
6. Offshore pipeline installation; and
7. Mooring/FSRU installation.

2. METHODOLOGY

Air quality impacts were evaluated using the United States Environmental Protection Agency's (USEPA's) SCREEN3 model, which is a computer software program that contains algorithms associated with USEPA's *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*. SCREEN3 uses dispersion screening techniques to estimate impacts of point, area, and volume stationary sources.

3. MODEL INPUTS

3.1 Source Descriptions

During offshore construction activities, air pollutants are emitted from only internal combustion engines. During onshore construction activities, air pollutants are emitted from internal combustion engines and as fugitive dust from equipment/vehicle operation. A summary of internal combustion equipment operation for each construction activity is presented in Table 1. This table includes the hourly fuel usage rate for each activity that was used to estimate exhaust parameters.

3.2 Exhaust Parameters

3.2.1 Internal Combustion Engines (Point Sources)

Internal combustion engines were evaluated as point sources with SCREEN3. Since SCREEN3 can only estimate impacts for one stack (point source) at a time, it was necessary to consolidate the various internal combustion engines used in equipment, vehicles, and/or vessels into a single source. Thus, air pollutants from all internal combustion engines were assumed to be emitted from a single "virtual stack" for each offshore and onshore construction activity scenario. The parameters of the "virtual stack" were set so that the height, exit velocity, and exit temperature would be roughly equivalent to the same parameters for the average engine stack. Stack parameters used for point sources in SCREEN3 are summarized in Table 2.

3.2.2 Fugitive Dust (Area Sources)

Since fugitive dust could be generated from equipment and vehicle operation within a specified construction zone for each onshore construction activity scenario, ambient impacts from these emissions were also modeled. Fugitive dust emissions from these construction zones were evaluated as area sources with SCREEN3. For purposes of this analysis, the construction zone for the Trenching and Pipelay scenarios was defined by a rectangular area with dimensions of 200 meters by 30 meters representative of a small portion of the pipeline corridor. As construction moves along the corridor, the ambient air quality impacts resulting from emissions in the representative area move with the construction activity and will only occur at a specific location for a limited amount of time. The construction zone for the Boring, Drilling, and Shore Crossing scenarios was defined as a rectangular drilling pad area with dimensions of 76 meters by 46 meters. Applicable parameters used for area source in SCREEN3 are summarized in Table 2.

3.3 Land Use Dispersion Options

In order to account for the different types of areas where onshore pipeline installation may occur, SCREEN3 runs for the Trenching, Pipelay, Boring, and Drilling scenarios were performed with both the "Urban" and "Rural" dispersion options. This analysis includes only results from the runs that produced higher (and, thus, more conservative) values. Since offshore and shore crossing construction will occur either overwater or in predominantly rural areas, SCREEN3 runs for the Shore Crossing, Offshore Pipelay, and Mooring scenarios were performed with only the "Rural" dispersion option. The dispersion options that results are based on are listed in Table 2.

3.4 Emission Rates

Daily emissions of NO_2, SO_2, CO, PM_{10}, and $PM_{2.5}$ during Project construction were estimated by the Applicant and are summarized in Appendix G1. These daily emissions were converted to emission rates in terms of pounds per hour (lb/hr) and grams per second (g/s) using the reported hours of daily operation of each construction activity. A summary of air pollutant emission rates for each point source and area source for these construction activities is presented in Table 3.

The SCREEN3 model was run using a standard emission rate of 1 g/s. Conversion of these "standard" model results to air quality impacts for each air pollutant was accomplished by multiplying the standard model results by the actual pollutant emission rate.

3.5 Receptors

SCREEN3 does not calculate air quality impacts at a specific location that might be defined by unique x and y coordinates, but instead calculates impacts at discrete distances from a point source or from the center of an area source. The model assumes the impact is the same value at the discrete distance regardless of direction from the emission source. For onshore construction activities, only air quality impacts that would occur outside of the construction zone were examined. For offshore construction activities, only air quality impacts that would occur onshore were examined. Since offshore pipeline installation would not take place within 910 meters (0.57 miles) of shore, only air quality impacts that would occur at locations equal to or greater than this distance were examined for this scenario. Since mooring/FSRU installation would not take place within 22.25 kilometers (13.8 miles) of shore, only air quality impacts that would occur at locations equal to or greater than this distance were examined for this scenario.

3.6 Meteorological Data

SCREEN3 contains a built-in set of meteorological conditions defined by USEPA. The range of conditions in the model represent combinations of wind speed and atmospheric stability (two parameters that have the greatest influence on dispersion) that could potentially occur. These combinations of atmospheric stability (defined in the model by six stability classes named A through F) and wind speed can be accessed in their entirety in the model by selecting "full meteorology" mode or individually by user selection.

SCREEN3 was operated in "full meteorology" mode for point sources (stacks). Since SCREEN3 evaluates impacts at discrete distances from the point source instead of at discrete receptor locations, wind direction is not used for the point source analysis.

Fugitive dust would only be generated during construction operations in the day time because equipment and vehicles generating the dust would only be used during daylight hours. Therefore, SCREEN3 was used only with Stability Classes A through D (with all corresponding wind speeds) for area sources (fugitive dust from construction zones). According to USEPA's *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources*, Stability Classes E through F only occur at night.

In the area source mode, SCREEN3 can search through the all wind directions (in relation to the axis of the “longer” side of the area source) to find the maximum impact. For the Boring, Drilling, and Shore Crossing scenario, SCREEN3 was set to search through the all wind directions. Since the Trenching and Pipelay scenario would occur along a continuous line, a location parallel to or almost parallel to the longer side of the area source (e.g., 0 degree angle from parallel) would likely fall within the pipeline corridor and, thus, would not be accessible to the public. Therefore, SCREEN3 runs for the Trenching and Pipelay scenarios were performed with discrete wind directions (15, 30, 45, 60, 75, and 90 degrees) to simulate impacts that could occur along the sides of the pipeline corridor.

4. RESULTS

SCREEN3 output was examined to identify the maximum 1-hour average impacts that occur:

- outside of the construction zone for the Trenching, Pipelay, Boring, Drilling, and Shore Crossing scenarios; and

- at onshore locations for the Offshore Pipeline and Mooring scenarios.

These 1-hour maximum impacts (based on the standard emission rate of 1 g/s) are shown in Table 4. This table also shows the corresponding distance for these impacts and, for the Trenching and Pipelay area sources only, the angle of wind direction relative to pipeline installations for these impacts.

Since SCREEN3 calculates only 1-hour average concentrations, multiplying factors were used to estimate concentrations at longer averaging times (i.e., 3-hour, 8-hour, 24-hour, and annual). The following multiplying factors are provided in USEPA's *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources* and other USEPA guidance:

Averaging Time	Multiplying Factor
3 hours	0.9
8 hours	0.7
24 hours	0.4
Annual	0.08

However, these factors assume continuous operation of the emission source (i.e., 24 hours/day and 365 days/year). Since Project construction activities would operate significantly less than 365 days per year and some of these activities would not operate 24 hours per day, the multiplying factors were adjusted accordingly. Adjustments to the multiplying factors are presented in Table 5.

A summary of the air quality impacts associated with each SCREEN3 point source and area source run is presented in Table 6. A comparison of air quality impacts to California Air Quality Standards and National Ambient Air Quality Standards (NAAQS) is presented in Table 7. The source of the background air quality data used for these comparisons is outlined in Table 8.

5. DISCUSSION

The objective of this screening-level analysis was to evaluate potential air quality impacts from Project-related construction that may require mitigation, not to definitively predict ambient pollutant concentrations for certain locations or areas.

The screening-level analyses indicates that NO_2, SO_2, and CO impacts from construction activities would be well below existing maximum background concentrations and corresponding State Ambient Air Quality Standards and NAAQS. When combined with these background concentrations, 1-hr NO_2 impacts would approach the State Ambient Air Quality Standard but are shown to be less than this standard.

The screening-level analysis also indicates that annual PM_{10} and $PM_{2.5}$ impacts would be well below existing maximum background concentrations and corresponding State Ambient Air Quality Standards and NAAQS. However, the analysis indicates that 24-hour PM_{10} and $PM_{2.5}$ impacts from construction could exceed existing maximum background concentrations, corresponding State Ambient Air Quality Standards and/or corresponding NAAQS.

The vast majority of these PM_{10}/$PM_{2.5}$ impacts can be attributed to fugitive dust generated during construction activities. Due to the difficulty associated with estimating fugitive dust emissions and with trying to replicate sources of fugitive dust within SCREEN3 (and other dispersion models), a high level of uncertainty should be assigned to the impacts predicted from fugitive dust emissions. This is not to say that these results are not relevant. Instead, the results should serve to satisfy the objective of the analysis, which was to identify potential air quality impacts that may require application of mitigation.

Based on the results of this analysis, the Applicant would be required to prepare a Construction Fugitive Dust Plan in addition to any dust control measures already proposed. Under this plan, the Applicant would continuously monitor ambient particulate concentrations during onshore construction to ensure that these activities would not lead to exceedences of ambient air quality standards.

Table 1
Summary of Construction Activities
Cabrillo Port LNG Deepwater Port

Activity	Equipment Type	No. of Devices	Mileage (mi/day)	Engine Rating per Device (bhp)	Daily Operation (hr/day)	Average Load	Working Days	Daily Output (bhp-hr/day or mi/day)	Fuel Use Rate (Btu/bhp-hr or Btu/mi)	Daily Fuel Input (MMBtu/day)	Hourly Fuel Usage (gal/hr)
Trenching	Trenching Machine	1		1,000	12	80%	180	9600	6,860	65.85	40.0
	Track Backhoe	1		500	12	80%	180	4800	6,860	32.93	20.0
	Front Loader	1		200	12	50%	180	1200	6,860	8.23	5.0
	Bulldozer	1		200	12	50%	180	1200	6,860	8.23	5.0
	Dragline	1		200	12	50%	180	1200	6,860	8.23	5.0
	Concrete Saw	1		50	12	50%	180	300	7,355	2.21	1.3
	TOTAL										**76**
Pipelay	Dump Truck	2	60		4		180	120	27,406	3.29	6.0
	Water Truck	2	60		4		180	120	27,406	3.29	6.0
	Utility Truck	2	60		4		180	120	27,406	3.29	6.0
	Heavy Fork Lift	1		200	12	50%	180	1200	6,860	8.23	5.0
	Lowboy Truck	4	120		8		180	480	27,406	13.15	12.0
	Pipe Stringing Truck	2	60		4		180	120	27,406	3.29	6.0
	Sideboom Tractor	2		200	12	50%	180	2400	6,860	16.46	10.0
	Mobile Crane	1		200	12	50%	180	1200	6,860	8.23	5.0
	Pipe Bending Machine	1		100	12	50%	90	600	6,860	4.12	2.5
	Hydrostatic Test Pump	1		200	12	50%	30	1200	6,860	8.23	5.0
	Fill Dirt Screener	1		200	12	50%	180	1200	6,860	8.23	5.0
	Sheepsfoot Compactor	1		200	12	50%	180	1200	6,860	8.23	5.0
	Cement Truck	2	60		4		90	120	27,406	3.29	6.0
	Cement Pump	1		100	12	50%	90	600	6,860	4.12	2.5
	Asphalt Truck	2	60		4		90	120	27,406	3.29	6.0
	Asphalt Paving Machine	1		200	12	50%	90	1200	6,860	8.23	5.0
	Welding Generator	2		50	12	50%	180	600	7,355	4.41	2.7
	Utility Generator	2		50	12	50%	180	600	7,355	4.41	2.7
	Air Compressor	2		50	12	50%	180	600	7,355	4.41	2.7
	Dewatering Pump	2		50	12	50%	30	600	7,355	4.41	2.7
	Vibratory Roller	2		50	12	50%	180	600	7,355	4.41	2.7
	Hydraulic Tamper	2		50	12	50%	180	600	7,355	4.41	2.7
	Asphalt Roller	1		100	12	50%	90	600	6,860	4.12	2.5
	TOTAL										**112**
Boring	Horizontal Boring Rig	1		1,000	24	80%	30	19200	6,860	131.71	40.0
	Track Backhoe	1		200	12	50%	30	1200	6,860	8.23	5.0
	All Terrain Forklift	1		100	12	50%	30	600	6,860	4.12	2.5
	Light Towers	6		20	12	100%	30	1440	6,860	9.88	6.0
	Heavy Lift Crane	1		500	6	50%	30	1500	6,860	10.29	12.5
	18 Wheeler Truck	2	60		4		30	120	27,406	3.29	6.0
	TOTAL										**72**
Drilling	Large Drilling Rig (HDD)	2		500	24	80%	30	19200	6,860	131.71	40.0
	Mud Cleaner Generator	1		400	24	80%	30	7680	6,860	52.68	16.0
	Mud Pumps	2		500	24	80%	30	19200	6,860	131.71	40.0
	Fluid Handling Pumps	4		75	24	80%	30	5760	6,860	39.51	12.0
	Track Backhoe	1		200	12	50%	30	1200	6,860	8.23	5.0
	All Terrain Forklift	1		100	12	50%	30	600	6,860	4.12	2.5
	Light Towers	6		20	12	100%	30	1440	6,860	9.88	6.0
	Heavy Lift Crane	1		500	6	50%	30	1500	6,860	10.29	12.5
	18 Wheeler Truck	2	60		4		30	120	27,406	3.29	6.0
	TOTAL										**140**
Shore Crossing	In-hole head drive unit	1		400	6	100%	88	2400	6,860	16.46	10.0
	Mud pumps	2		400	9	100%	88	7200	6,860	49.39	30.0
	Solids control unit	1		500	8	100%	88	4000	6,860	27.44	16.7
	Thrusting apparatus	1		300	6	100%	88	1800	6,860	12.35	7.5
	Electrical generator	1		400	24	80%	85	7680	6,860	52.68	16.0
	All Terrain Forklift	1		100	12	30%	60	360	6,860	2.47	0.8
	Mobile crane	1		400	7.2	80%	85	2304	6,860	15.81	4.8
	Welding machines	3		100	12	80%	85	2880	6,860	19.76	6.0
	Exit Hole Barge Tug	1		4,000	24	5%	35	4800	6,860	32.93	10.0
	AHTS	1		15,000	24	10%	35	36000	6,860	246.95	75.1
	*Contingency	1		700	24	100%	60	16800	6,860	115.25	35.0
	18 Wheeler Truck	2	60		4		60	120	27,406	3.29	6.0
	TOTAL										**218**
Mooring	Pipe Laying Vessel	1		25,000	24	47%	35	282000	6,860	1934.47	588.2
	AHTS	2		15,000	24	10%	35	72000	6,860	493.91	150.2
	Crew Boat	1		1,500	16	23%	35	5520	6,860	37.87	17.3
	Tug Boat & Barge	1		4,000	16	26%	10	16640	6,860	114.15	52.1
	Dock Crane (35 ton)	1		130	1	80%	8	104	6,860	0.71	5.2
	TOTAL										**813**
Mooring	AHTS	2		15,000	24	10%	20	72000	6,860	493.91	150.2
	Crew Boat	1		1,500	16	23%	20	5520	6,860	37.87	17.3
	Construction Barge	1		8,000	24	43%	20	82560	6,860	566.35	172.2
	Tug	1		6,500	24	9%	20	14040	6,860	96.31	29.3
	Ocean Going Tug	1		25,000	24	20%	1	120000	6,860	823.18	250.3
	TOTAL										**619**

Table 2
SCREEN3 Model Input Parameters
Cabrillo Port LNG Deepwater Port

Engine Exhaust Parameters

Parameter	Units	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
Total Fuel Usage	gal/hr	112	76	72	140	218	813	619
Fuel Higher Heating Value	BTU/gal	137,030	137,030	137,030	137,030	137,030	137,030	137,030
Heat Input	mmBTU/hr	15.3	10.5	9.9	19.2	29.8	111.4	85
Fd Factor	wscf/mmBTU	10,320	10,320	10,320	10,320	10,320	10,320	10,320
Release Flowrate	wscf/hr	559,361	382,888	361,082	702,139	1,090,844	4,072,369	3,102,113
Release Flowrate	wacf/sec	371	254	239	465	723	2,699	2,056
Release Flowrate	wacm/sec	10.5	7.2	6.8	13.2	20.5	76.4	58

SCREEN3 Input Parameters - POINT SOURCES

Parameter	Units	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
Unit Emission Rate	g/sec	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Release Height	meters	2.5	2.5	4	4	4	7	7
Release Diameter	meters	0.545	0.451	0.438	0.611	0.761	1.471	1.284
Release Velocity	meters/sec	45.0	45.0	45.0	45.0	45.0	45.0	45.0
Release Temperature	degrees K	700	700	700	700	700	700	700
Ambient Temperture	degrees K	293	293	293	293	293	293	293
Receptor Height	meters	1.5	1.5	1.5	1.5	1.5	1.5	1.5
Stability Class	A - F	All	All	All	All	All	All	All
Terrain Type	Simple/Complex	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)
Dispersion Coefficient	Urban/Rural	Urban	Urban	Urban	Urban	Rural	Rural	Rural

SCREEN3 Input Parameters - AREA SOURCES

Parameter	Units	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
Unit Emission Rate[a]	g/sec-m^2	0.000167	0.000167	0.000286	0.000286	0.000286	n/a	n/a
Release Height	meters	0	0	0	0	0	n/a	n/a
Length of Longer Side	meters	200	200	76	76	76	n/a	n/a
Length of Shorter Side	meters	30	30	46	46	46	n/a	n/a
Receptor Height	meters	1.5	1.5	1.5	1.5	1.5	n/a	n/a
Stability Class	A - F	A-D	A-D	A-D	A-D	A-D	n/a	n/a
Terrain Type	Simple/Complex	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)	Simple (flat)	n/a	n/a
Dispersion Coefficient	Urban/Rural	Rural	Rural	Rural	Rural	Rural	n/a	n/a

Notes:
a. Unit emission rate calculated by dividing 1 g/s by (longer side x shorter side).

Table 3
SCREEN3 Model Input Emission Rates
Cabrillo Port LNG Deepwater Port

Daily Emissions (lb/day)

Pollutant	Source	Activity						
		Pipelay	**Trenching**	**Boring**	**Drilling**	**Shr Crossing**	**Off-Pipelay**	**Mooring**
NO_2	Engine Exhuast	237	276	368	865	1,323	5,724	4,474
SO_2	Engine Exhuast	1.3	0.28	0.27	0.62	0.90	4.01	3.14
CO	Engine Exhuast	1123	413	449	1,060	1,625	7,051	5,512
PM_{10}	Engine Exhuast	11	16	21	50	77	332	259
	Fugitive Dust[a]	19.5	15.3	5.7	5.7	5.7	-	-
$PM_{2.5}$	Engine Exhuast	11	16	21	50	77	332	259
	Fugitive Dust[a]	8.2	7.6	2.7	2.7	2.7	-	-

Notes:
a. Fugitive dust emissions includes, where applicable, paved/unpaved roads (only within construction zones), earthmoving, and tertiary crushing/material handling.

Hourly Emissions (lb/hr)

Pollutant	Source	Activity						
		Pipelay[a]	**Trenching[a]**	**Boring[b]**	**Drilling[b]**	**Shr Crossing[b]**	**Off-Pipelay[b]**	**Mooring[a]**
NO_2	Engine Exhuast	19.75	23	15.33	36.04	55.13	238.49	372.85
SO_2	Engine Exhuast	0.108	0.023	0.01	0.03	0.04	0.17	0.261
CO	Engine Exhuast	94	34	18.71	44.17	67.71	293.79	459
PM_{10}	Engine Exhuast	0.92	1.33	0.88	2.08	3.21	13.83	21.61
	Fugitive Dust	1.63	1.28	0.24	0.24	0.24	-	-
$PM_{2.5}$	Engine Exhuast	0.92	1.33	0.88	2.08	3.21	13.83	21.61
	Fugitive Dust	0.68	0.63	0.11	0.11	0.11	-	-

Notes:
a. Hourly Emissions = Daily Emissions / 12 hours per day (normal operating daily operating period)
b. Hourly Emissions = Daily Emissions / 24 hours per day (normal operating daily operating period)

SCREEN3 Input Emissions (g/s)

Pollutant	Source	Activity[a]						
		Pipelay	**Trenching**	**Boring**	**Drilling**	**Shr Crossing**	**Off-Pipelay**	**Mooring**
NO_2	Engine Exhuast	2.49	2.90	1.93	4.54	6.95	30.05	46.98
SO_2	Engine Exhuast	0.0137	0.0029	0.0014	0.0033	0.0047	0.0211	0.0329
CO	Engine Exhuast	11.79	4.34	2.36	5.57	8.53	37.02	57.87
PM_{10}	Engine Exhuast	0.12	0.17	0.11	0.26	0.40	1.74	2.72
	Fugitive Dust	0.20	0.16	0.03	0.03	0.03	-	-
$PM_{2.5}$	Engine Exhuast	0.12	0.17	0.11	0.26	0.40	1.74	2.72
	Fugitive Dust	0.086	0.080	0.014	0.014	0.014	-	-

Notes:
a. SCREEN3 Input Emissions = Hourly Emissions x 453.6 g/lb / 3600 sec/hr

Table 4
SCREEN3 Model Output
Cabrillo Port LNG Deepwater Port

SCREEN3 Output - POINT SOURCES

Parameter	Units	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
Maximum 1-hr Concentration	μg/m^3	69.45	108.6	86.08	42.75	15.77	2.97	1.77
Distance to Maximum	meters	61	48	54	78	332	910	22,250

SCREEN3 Output - AREA SOURCES

Parameter	Units	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
Maximum 1-hr Concentration[a]	μg/m^3	4112	4112	5754	5754	5754	n/a	n/a
Distance to Maximum	meters	66	66	56	56	56	n/a	n/a
Angle of Wind Direction[b]	-	15	15	n/a	n/a	n/a	n/a	n/a

Notes:
a. Only impacts that fall outside of restricted construction area are listed.
b. Angle of Wind Direction Relative to Direction of Pipeline Installation

Table 5
SCREEN3 Multiplying Factors
Cabrillo Port LNG Deepwater Port

Averaging Period	Conversion Factor[a]						
	Pipelay[b]	Trenching[b]	Boring[c]	Drilling[c]	Shr Crossing[d]	Off-Pipelay[e]	Mooring[f]
3 hours	0.9	0.9	0.9	0.9	0.9	0.9	0.9
8 hours	0.7	0.7	0.7	0.7	0.7	0.7	0.7
24 hours	0.2	0.2	0.4	0.4	0.4	0.4	0.2
Annual	0.00108	0.00108	0.0066	0.0066	0.013	0.0077	0.0044

Notes:

a. Except where noted multiplying factors based on EPA Factors in *Screening Procedures for Estimating the Air Quality Impact of Stationary Sources (Revised), EPA-454/R-92-019, pages 4-16. These factors assume operation 24 hr/day, 365 days/yr.*

b. Since activity will only occur 12 hr/day: 24-hour factor = EPA Factor of 0.4 x 0.5 (12 hr / 24-hr); Since activity will not take place in one area for more than 10 days: Annual factor = EPA Factor of 0.08 x 0.5 (12 hr / 24 hr) x 0.027 (10 days / 365 days).

c. Since activity will not take place in one area for more than 30 days: Annual factor = EPA Factor of 0.08 x 0.082 (30 days / 365 days).

d. Since emission estimates are based on 60 days: Annual factor = EPA Factor of 0.08 x 0.164 (60 days / 365 days).

e. Since activity will not take place for more than 35 days: Annual factor = EPA Factor of 0.08 x 0.0.096 (35 days / 365 days).

f. Since activity will not take place in one area for more than 24 days: Annual factor = EPA Factor of 0.08 x 0.055 (20 days / 365 days).

Table 6
SCREEN3 Results
Cabrillo Port LNG Deepwater Port

Impact Results - POINT SOURCES

Pollutant	Averaging Period	Impact ($\mu g/m^3$)						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
NO_2	1-hr	173	315	166	194	110	89	83
	Annual	0.19	0.34	1.10	1.28	1.42	0.69	0.37
SO_2	1-hr	0.95	0.32	0.12	0.14	0.07	0.06	0.06
	3-hr	0.85	0.29	0.11	0.13	0.07	0.06	0.05
	24-hr	0.190	0.064	0.049	0.056	0.030	0.025	0.012
	Annual	0.00102	0.00034	0.00081	0.00092	0.00097	0.00048	0.00026
CO	1-hr	819	471	203	238	135	110	102
	8-hr	573.2	329.7	142.0	166.5	94.2	77.0	71.7
PM_{10}	24-hr	1.6	3.6	3.8	4.5	2.6	2.1	1.0
	Annual	0.009	0.020	0.063	0.074	0.083	0.040	0.021
$PM_{2.5}$	24-hr	1.6	3.6	3.8	4.5	2.6	2.1	1.0
	Annual	0.009	0.020	0.063	0.074	0.083	0.040	0.021

Impact Results - AREA SOURCES (PM_{10} and $PM_{2.5}$ Only) [Fugitive Dust]

Pollutant	Averaging Period	Impact ($\mu g/m^3$)						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
PM_{10}	24-hr	168	132	69	69	69	n/a	n/a
	Annual	0.91	0.71	1.14	1.14	2.24	n/a	n/a
$PM_{2.5}$	24-hr	71	66	33	33	33	n/a	n/a
	Annual	0.38	0.35	0.54	0.54	1.06	n/a	n/a

Impact Results - COMBINED POINT and AREA SOURCES (PM_{10} and $PM_{2.5}$ Only)

Pollutant	Averaging Period	Activity						
		Pipelay	Trenching	Boring	Drilling	Shr Crossing	Off-Pipelay	Mooring
PM_{10}	24-hr	170	136	73	73	71	2.1	1.0
	Annual	0.9	0.7	1.2	1.2	2.3	0.04	0.02
$PM_{2.5}$	24-hr	72	69	36	37	35	2.1	1.0
	Annual	0.39	0.37	0.60	0.61	1.14	0.04	0.02

Table 7
Comparison of Potential Impacts to Ambient Air Quality Standards
Cabrillo Port LNG Deepwater Port

Pollutant	Avg Period	Modeled Impact ($\mu g/m^3$)							Bkgd Conc. ($\mu g/m^3$)	Total Impact ($\mu g/m^3$)							State Air Quality Standard ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
		Pipelay	Trench	Boring	Drilling	S Cross	Off-Pipe	Mooring		Pipelay	Trench	Boring	Drilling	S Cross	Off-Pipe	Mooring		
NO_2	1-hr	173	315	166	194	110	89	83	139	312	454	305	333	249	228	222	470	-
	Annual	0.2	0.3	1.1	1.3	1.4	0.7	0.4	26	26	26	27	27	27	27	26	-	100
SO_2	1-hr	0.95	0.32	0.12	0.14	0.07	0.06	0.058	39	40	39	39	39	39	39	39	655	-
	3-hr	0.85	0.29	0.11	0.13	0.07	0.06	0.052	35	36	35	35	35	35	35	35	-	1,300
	24-hr	0.19	0.06	0.05	0.06	0.03	0.03	0.012	24	24	24	24	24	24	24	24	105	365
	Annual	0.0010	0.0003	0.0008	0.0009	0.0010	0.0005	0.00026	10	10	10	10	10	10	10	10	-	80
CO	1-hr	819	471	203	238	135	110	102	8,243	9,062	8,714	8,446	8,481	8,378	8,353	8,345	23,000	40,000
	8-hr	573	330	142	167	94	77	72	4,007	4,580	4,337	4,149	4,174	4,101	4,084	4,079	10,000	10,000
PM_{10}	24-hr	170	136	73	73	71	2.1	1.0	124	294	260	197	197	195	126	125	50	150
	Annual	0.9	0.7	1.2	1.2	2.3	0.040	0.021	31	32	32	32	32	33	31	31	20	50
$PM_{2.5}$	24-hr	72	69	36	37	35	2.1	1.0	82	154	151	118	119	117	84	83	-	65
	Annual	0.4	0.4	0.6	0.6	1.1	0.040	0.021	11.7	12	12	12	12	13	12	12	12	15

Table 8
Background Data
Cabrillo Port LNG Deepwater Port

Pollutant	Averaging Period	Monitoring Station and Year	Molecular Weight (g/mol)	Maximum Measured Concentration[a] (ppm)	Maximum Measured Concentration[a] ($\mu g/m^3$)
NO_2	1-hour	El Rio 2000	46.005	0.074	139
	Annual	El Rio 2000	46.005	0.014	26
SO_2	1-hour	El Rio 2001	64.062	0.015	39
	3-hour	El Rio 2001	64.062	0.014	35
	24-hour	El Rio 2001	64.062	0.009	24
	Annual	El Rio 2001	64.062	0.004	10
CO	1-hour	El Rio 2003	28.010	7.2	8,243
	8-hour	El Rio 2003	28.010	3.5	4,007
PM_{10}	24-hour	El Rio 2003	-	-	124
	Annual	El Rio 2003	-	-	31
$PM_{2.5}$	24-hour	El Rio 2003	-	-	82
	Annual	El Rio 2003	-	-	11.7

Notes:

a. Monitoring data at station for years 2000 to 2004 to identify the maximum concentration.